T7 Release 10.1

Extended Market Data Service

Trade Prices, Settlement Prices and Open Interest Data

Manual - Production Version

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Content

1. Introduction

The Trading System T7 provides market and reference data via a set of multicast interfaces.

In addition to the Market Data Interface (MDI) for netted market data, the Enhanced Market Data Interface (EMDI) for un-netted market data, Enhanced Order Book Interface (EOBI) and the Reference Data Interface (RDI) for reference data, the Extended Market Data Service (EMDS) is also provided.

All interfaces distribute information via UDP multicast, following FIX 5.0 SP2 semantics and are FAST 1.1/1.2 encoded (except EOBI). Messages are in general published on two identical services (A and B) with different multicast addresses (live-live concept).

The present document describes the Extended Marked Data Service for Xetra and Eurex.

The Extended Market Data Service provides participants of T7 with:

- Intraday Settlement prices and Open Interest data (for Derivatives only)
- Trade Price information

This document lists the multicast addresses and describes the message layouts of the interface. FAST 1.1 and 1.2 templates will be provided for this Interface on the Eurex website at www.eurex.com and on the Xetra website www.xetra.com.

Based on an internal, reliable data stream an All Trade Price (ATP) stream is offered which disseminates in real time all trade prices for the T7 cash markets.

Furthermore, an additional 'Replay Service' is provided which allows users to 'recover' from loss for the following data items:

- Intraday Settlement prices,
- Open Interest data and
- Trades from T7 (on-exchange and off-book trades)

Concerning undeferred market data, the Replay service is simply a re-send of the data that was sent out before in real-time to give applications a chance to re-capture data again in its full format. There is no linkage in sequence numbers etc. between the real-time data and the replay data. The replay service for the cash market products is based on the ATP stream mentioned above.

Concerning TES trades (trades from the T7 Entry Service) which under MiFID II regulations are eligible for *deferred publication* (e.g. due to the size of a block trade), the Replay service is the mechanism for publication via multicast channels. The only other feed disseminating deferred TES trade reports is CEF Core – there are no such trade messages available on EMDI, however. The deferred messages are of type Trade Price (TID=175).

As this service is based on multicast, no individual requests are possible. Instead these messages are sent out at predefined times in replay cycles which start with a heading 'start of service' message and end with a trailing 'end of service' message (MDReport message). The number of messages is provided at each start of a cycle. All replay messages are sequenced within the appropriate multicast channel. Each cycle for the Eurex replay service for the US-allowed and the US-restricted products is triggered separately. The replay service should be processed for each channel separately. There are

at least two replay cycles per multicast channel per trading day. Within one replay cycle the data is replayed several times directly in a row.

Please note: The present document explains the Extended Market Service only. The other market and reference data interfaces listed above are described in the Market and Reference Data Interfaces Manual, which explains the general rules regarding FIX messages, FAST encoding and the live-live concept.

The Extended Market Data Interface described in this manual has a version number. The version number is also listed at the beginning of the FAST XML templates.
This manual relates to the interface version number 101.000.000.

Details regarding the EMDS Service 'Ticker data' are described in the separate document 'T7 Extended Market Data Service - Underlying Ticker Data Manual'.

2.   Multicast addresses

The Settlement prices, Open Interest and Trade prices are disseminated via the following multicast addresses and port combinations in the Deutsche Börse Group network:

2.1   Production multicast addresses and ports

2.1.1   For Real-time Service

Service	Multicast - A	Multicast - B	Ports
Settlement prices – Eurex T7	224.0.50.77	224.0.50.205	Eurex T7:
Adj. Open Interest – Eurex T7	224.0.50.78	224.0.50.206	US-allowed products: 59000 US-restricted products: 59032
Xetra trades (XETR) - ATP	224.0.161.64	224.0.163.64	59000
Xetra trades (XBUL) - ATP	224.0.161.76	224.0.163.76	59000
Xetra trades (XMAL) - ATP	224.0.161.77	224.0.163.77	59000
Xetra trades (XVIE) - ATP	224.0.161.68	224.0.163.68	59000
Xetra trades (XFRA) - ATP	224.0.161.72	224.0.163.72	56000

2.1.2   For Replay Service

Service	Multicast - A	Multicast - B	Ports
Settlement prices – Eurex T7	224.0.50.77	224.0.50.205	Eurex T7:
Adj. Open Interest – Eurex T7	224.0.50.78	224.0.50.206	US-allowed products: 59001
Eurex T7 trades (incl. TES)	224.0.50.79	224.0.50.207	US-restricted products: 59033
Xetra trades (XETR) – ATP based	224.0.161.64	224.0.163.64	59001
Xetra trades (XBUL) – ATP based	224.0.161.76	224.0.163.76	59001
Xetra trades (XMAL) – ATP based	224.0.161.77	224.0.163.77	59001
Xetra trades (XVIE) – ATP based	224.0.161.68	224.0.163.68	59001
Xetra trades (XFRA) – ATP based (except prices without turnover)	224.0.161.72	224.0.163.72	56001

Non-disclosed (deferred) TES trades are disseminated under the same multicast addresses as the other T7 trades.

2.2 Simulation multicast addresses and ports

2.2.1 For Real-time Service

Service	Multicast - A	Multicast - B	Ports
Settlement prices – Eurex T7	224.0.50.93	224.0.50.221	Eurex T7: US-allowed products: 59500 US-restricted products: 59532
Adj. Open Interest – Eurex T7	224.0.50.94	224.0.50.222	
Xetra trades (XETR) - ATP	224.0.164.120	224.0.165.120	59500
Xetra trades (XBUL) - ATP	224.0.164.120	224.0.165.120	59520
Xetra trades (XMAL) - ATP	224.0.164.120	224.0.165.120	59510
Xetra trades (XVIE) - ATP	224.0.164.121	224.0.165.121	59500
Xetra trades (XFRA) - ATP	224.0.164.122	224.0.165.122	56500

2.2.2 For Replay Service

Service	Multicast - A	Multicast - B	Ports
Settlement prices – Eurex T7	224.0.50.93	224.0.50.221	Eurex T7: US-allowed products: 59501 US-restricted products: 59533
Adj. Open Interest – Eurex T7	224.0.50.94	224.0.50.222	
Eurex T7 trades (incl. TES)	224.0.50.95	224.0.50.223	
Xetra trades (XETR) – ATP based	224.0.164.120	224.0.165.120	59501
Xetra trades (XBUL) – ATP based	224.0.164.120	224.0.165.120	59521
Xetra trades (XMAL) – ATP based	224.0.164.120	224.0.165.120	59511
Xetra trades (XVIE) – ATP based	224.0.164.121	224.0.165.121	59501
Xetra trades (XFRA) – ATP based (except prices without turnover)	224.0.164.122	224.0.165.122	56501

Non-disclosed (deferred) TES trades are disseminated under the same multicast addresses as the other T7 trades.

2.3   Service availability

To prevent network overload in peak situations, the bandwidth is limited, which might cause small delays. The service will be technically available at least between 7:00 CET and 23:10 CET.

The Adjusted Open Interest will be available after 13:30 CET. The intraday Settlement Prices will be available as soon as they are determined by Eurex in the afternoon (different product groups have different schedules).

Replay dissemination schedule

Replay dissemination start time	Replay content
8:10 am CET	Eurex trades – 1st cycle
1:00 pm CET	Xetra trades – 1st cycle
1:30 pm CET	Xetra Frankfurt trades – 1st cycle
2:00 pm CET	Eurex Adjusted Open interest – 1st cycle
5:45 pm CET	Eurex trades – 2nd cycle
6:00 pm CET	Xetra trades – 2nd cycle
6:15 pm CET	Eurex Settlement prices – 1st cycle
6:30 pm CET	Eurex Adjusted Open interest – 2nd cycle
8:15 pm CET	Eurex trades – 3rd cycle
10:10 pm CET	Xetra Frankfurt trades – 2nd cycle
10:30 pm CET	Eurex trades – 4th cycle
10:40 pm CET	Eurex Settlement prices – 2nd cycle
10:55 pm CET	Eurex Adjusted Open interest – 3rd cycle
11:00 pm CET	Eurex non-disclosed TES trades

3. Data and service messages

3.1 Settlement prices (TID = 172)

FIX Tag	FIX Field Name	Req'd	FAST Data Type	Description
35	MsgType	Y	string	Message type Always 'W' = MarketDataSnapshotFullRefresh
48	SecurityID	Y	Int64	Instrument ID from T7 Trading System
22	SecurityIDSource	Y	string	Source Identification Always 'M' = Marketplace-assigned Identifier
1300	MarketSegmentID	Y	uInt32	Product ID from T7 Trading System
<MDFullGrp> sequence starts				
268	NoMDEntries	Y	length	Defines the number of entries to follow.
269	> MDEntryType	Y	MDEntryType (enum)	Type of Market Data entry Always '6' = Settlement Price
270	> MDEntryPx	Y	decimal	Intraday Settlement Price
29830	> MDSecPx	N	decimal	Settlement Price in trading notation (only for Variance Futures)
731	> SettlPriceType	Y	uInt32	Settlement Supplement 1 = Final (Final Settlement) 2 = Theoretical (Daily Settlement)
273	> MDEntryTime	Y	timestamp	Time of entry
<MDFullGrp> sequence ends				

Note: The settlement prices of the previous business day are provided with Reference data feed RDI in the instrument snapshot message and the Reference data file (RDF).

3.2 Adjusted open Interest (TID = 171)

FIX Tag	FIX Field Name	Req'd	FAST Data Type	Description
35	MsgType	Y	string	Message type Always 'W' = MarketDataSnapshotFullRefresh
48	SecurityID	Y	Int64	Instrument ID from T7 Trading System
22	SecurityIDSource	Y	string	Source Identification Always 'M' = Marketplace-assigned Identifier
1300	MarketSegmentID	Y	uInt32	Product ID from T7 Trading System
<MDFullGrp> sequence starts				
268	NoMDEntries	Y	length	Defines the number of entries to follow. Here always '1'.
269	> MDEntryType	Y	MDEntryType (enum)	Type of Market Data entry Always 'C' = Open Interest
271	> MDEntrySize	Y	decimal	Adjusted Open Interest Quantity
273	> MDEntryTime	Y	timestamp	Time of entry
<MDFullGrp> sequence ends				

3.3   Trade prices (TID = 175)

For the dissemination of the trades from T7 Trading System template id 175 is used which closely resembles the template id 94 that is defined for EMDI/MDI trades (DepthIncremental messages), but those parts that relate to orderbook information were removed.

FIX Tag	FIX Field Name	Req'd	FAST Data Type	Description
35	MsgType	Y	string	Message type Always 'X' = MarketDataIncrementalRefresh
34	MsgSeqNum	Y	uInt32	The sequence number is incremented per product across all message types on a particular feed.
49	SenderCompID	Y	uInt32	Unique ID of a sender.
1300	MarketSegmentID	Y	uInt32	Technical Product ID from T7 Trading System
<MDIncGrp> sequence starts				
268	NoMDEntries	Y	length	Defines the number of entries to follow. Here always '1'.
1024	> MDOriginType	Y	MDOriginType (enum)	Market Data origin 0 = Book (On-exchange trading) 1 = Off-Book (TES trades only)
279	> MDUpdateAction	Y	MDUpdateAction (enum)	Type of Market Data update action 0 = New 1 = Change 2 = Delete
269	> MDEntryType	Y	MDEntryType (enum)	Type of Market Data entry '2' = Trade 'B' = Trade Volume
48	> SecurityID	Y	Int64	Technical Instrument ID from T7 Trading System
22	> SecurityIDSource	Y	string	Source Identification Always 'M' = Marketplace-assigned Identifier
270	> MDEntryPx	N	decimal	Trade Price
271	> MDEntrySize	N	decimal	Quantity or trade volume when MDEntryType = "2" or "B". TES disclosed quantity when MDOriginType is 1 = Off-Book.
273	> MDEntryTime	N	timestamp	Official time of execution (in nanoseconds)

828	> TrdType	N	TrdType (enum)	Trade Type 0 = Regular Trade 1 = Block Trade / Large in Scale (LIS) 2 = Exchange for Physical (EFP) 12 = Exchange for Swap (EFS) 50 = Portfolio Compression Trade 54 = OTC (not used) 55 = Exchange Basis Facility (obsolete) 1000 = Vola Trade 1001 = EFP-Fin Trade 1002 = EFP-Index-Futures Trade 1004 = Block Trade at Market 1006 = Xetra/Eurex Enlight triggered Trade 1007 = Block QTPIP Trade 1100 = Opening Auction Trade 1101 = Intraday Auction Trade 1102 = Volatility Auction Trade 1103 = Closing Auction Trade 1104 = Cross Auction Trade 1107 = IPO Auction Trade 1108 = Liquidity Improvement Cross
2667	> AlgorithmicTrade-Indicator	N	Algorithmic Trade-Indicator (enum)	A trade has to be flagged as "algorithmic", if at least one of the matched orders was submitted by a trading algorithm. Applicable for cash market products only. 1 = Algorithmic Trade
277	> TradeCondition	N	TradeCondition (set)	Defines the type of price for MDEntryPx. U = Exchange Last R = Opening Price AX = High Price AY = Low Price AJ = Official Closing Price AW = Last Auction Price k = Out of sequence BD = Previous Closing Price a = Volume Only BB = Midpoint price BC = Trading on Terms of Issue SA = Special Auction TC = Trade At Close
442	> MultiLegReportingType	N	MultiLeg-Reporting-Type (enum)	Only applicable for TES trades of derivatives market products. 1 = Single Security 2 = Individual Leg of a Multileg Security - Used to report a TES leg trade price of a complex instrument trade 3 = Multi Leg Security - Used to report a TES trade price on the complex instrument.
28750	> MultiLegPriceModel	N	MultiLeg-PriceModel	Only applicable for TES trades of derivatives market products. 0 = Standard

			(enum)	1 = User Defined - Used to report TES leg trade prices entered by a user.
2445	> AggressorTime	N	timestamp	Entry time of the incoming order that triggered the trade. Only present for MDEntryType = 2.
2446	> AggressorSide	N	Aggressor-Side (enum)	Side of the incoming order that triggered the trade. Only present for MDEntryType = 2. 1 = Buy 2 = Sell
2449	> NumberOfBuyOrders	N	uInt32	Number of buy orders involved in this trade. Only present for MDEntryType=2 and Trade Condition other than "a" (Volume Only).
2450	> NumberOfSellOrders	N	uInt32	Number of sell orders involved in this trade. Only present for MDEntryType=2 and Trade Condition other than "a" (Volume Only).
6139	> TotalNumberOfTrades	N	uInt32	Total number of trades during the day. Only present for MDEntryType=2. Applicable for cash market products only. An increment of TotalNumberOfTrades is defined as the maximum of NumberOfBuyOrders (2449) and NumberOfSellOrders (2450) per trade.
28869	> RestingCxlQty	N	decimal	Quantity that was cancelled due to SMP. Only present for MDEntryType = 2.
278	> MDEntryID	N	uInt32	Represents the match step ID. This field is unique together with MarketSegmentID.
28873	> NonDisclosedTrade Volume	N	decimal	Contains the TES trade volume that is not displayed during the day. Only present for MDEntryType B = Trade Volume. Used when trade volume is finally disclosed and for recovery.
<Parties> (optional) sequence starts				
453	>NoPartyIDs	N	length	Number of PartyID (448), PartyIDSource (447), and PartyRole (452) entries. Here always '1'.
448	>>PartyID	N	string	Execution Venue ID
447	>>PartyIDSource	N	string	Market Identifier Code (ISO 10383) MIC Here always 'G'.
452	>>PartyRole	N	uInt32	Identifies the type or role of the PartyID (448) specified. Here always '73' (Execution Venue)
<Parties> (optional) sequence ends				
<MDIncGrp> sequence ends				

3.4 Packet header (TID = 76)

Each datagram contains a packet header which is used for identification of datagrams and is sent on a channel basis. Each header contains the following fields:

Field Name	FAST Data Type	Description
SenderCompID	uInt32	Unique id for a sender Each multicast channel uses the same logic. Constant value: • Standard Value • Failover Value
PacketSeqNum	ByteVector	Datagram/packet sequence number Contiguous. Can be used for gap detection. Sequenced for each multicast channel itself. The PacketSeqNum's in the packet header are contiguous per SenderCompID, multicast address and port combination.
SendingTime	ByteVector	Time at which this packet left the sender (in nanoseconds since epoch).

The following table shows the structure of the block header before FAST-decoding:

1 Byte	1 Byte	1 Byte	1 Byte	4 Bytes	1 Byte	8 Bytes
PMAP	TID	Sender Comp ID	Length	PacketSeqNum	Length	SendingTime
1	2	3	4	8	9	17

3.5 Extended technical heartbeat (TID = 170)

The heartbeat message is sent periodically as a 'line active' indicator when there are no messages generated on the feed for a preconfigured period of time. Each heartbeat contains the following fields:

Field Name	FAST Data Type	Description
SenderCompID	uInt32	Unique id for a sender. Each multicast channel uses the same logic. Constant value: • Standard Value • Failover Value
LastPacketSeqNum	uInt32	Contains the last PacketSeqNum of the corresponding multicast channel.

3.6 Market Data Report Message (TID = 152)

The MDReport message is used for the Replay Service. It is sent as a wraparound bracket for distributing the product and instrument snapshots. Since the replay service is also a dissemination cycle, start and end marks are needed. Each MDReport contains the following fields:

FIX Tag	FIX Field Name	Req'd	FAST Data Type	Description
35	MsgType	Y	string	U20 - MarketDataReport
2536	MDReportCount	N	uInt32	Count of messages in the replay cycle. Only sent for MDReportEvent 3, 5, 7 and 9
369	LastMsgSeqNumProcessed	N	uInt32	
2535	MDReportEvent	Y	MDReport Event (enum)	1 = Start of instrument reference Data (not used) 2 = End of instrument reference Data (not used) 3 = Start of off-market trades 4 = End of off-market trades 5 = Start of order book (exchange) trades 6 = End of order book (exchange) trades 7 = Start of open interest 8 = End of open interest 9 = Start of settlement prices 10 = End of settlement prices 11 = Start of statistics reference data 12 = End of statistics reference data 13 = Start of statistics (not used) 14 = End of statistics (not used)
60	TransactTime	Y	timestamp	Transaction Time

4. Change log

No	Chapter, page	Date	Change
8.00	General	Jul 24, 2019	Creation of simulation version for T7 8.0
8.01	Ch. 2	Aug 14, 2019	Minor updates for XFRA (Replay times and content)
8.02	General + Ch. 3.3	Oct 18, 2019	Creation of Production Version for T7 8.0, renamed some TradeConditions
8.03	Ch. 2.1 and 2.2	Nov 01, 2019	Aligned Ports for XFRA with Network Access Guide
8.04	Pg. 2 + Ch. 2	Jan 31, 2020	Updated Disclaimer / Corrected Multicast-B address for XFRA Simulation
8.10	General	Mar 19, 2020	Creation of simulation version for T7 8.1
8.12	General	May 28, 2020	Creation of production version for T7 8.1
9.00	General + Ch. 3.3	Jul 28, 2020	Creation of simulation version for T7 9.0, added new value 50 for TrdType and TC for TradeCondition in chapter 3.3 (Trade prices), updated packet header and interface version no.
9.01	General + Ch. 2.3	Oct 12, 2020	Creation of production version for T7 9.0, changed comment regarding limited network bandwidth.
9.1	General + Ch. 2	Mar 26, 2021	Creation of simulation version for T7 9.1 and removal of Eurex T7/FX multicast addresses, changed packet header and Interface version number
9.11	General	May 10, 2021	Creation of production version for T7 9.1
10.0	General	July 27, 2021	Creation of simulation version for T7 10.0, updated packet header to 75 and interface version number
10.1	General	Mar 08, 2022	Creation of simulation version for T7 10.1, added tag 731 (SettlPriceType) in chapter 3.1, updated packet header to 76 and interface version number
10.11	General	May 13, 2022	Creation of production version of T7 10.1
10.12	Ch. 3.1	May 23, 2022	SettlPriceType set to mandatory